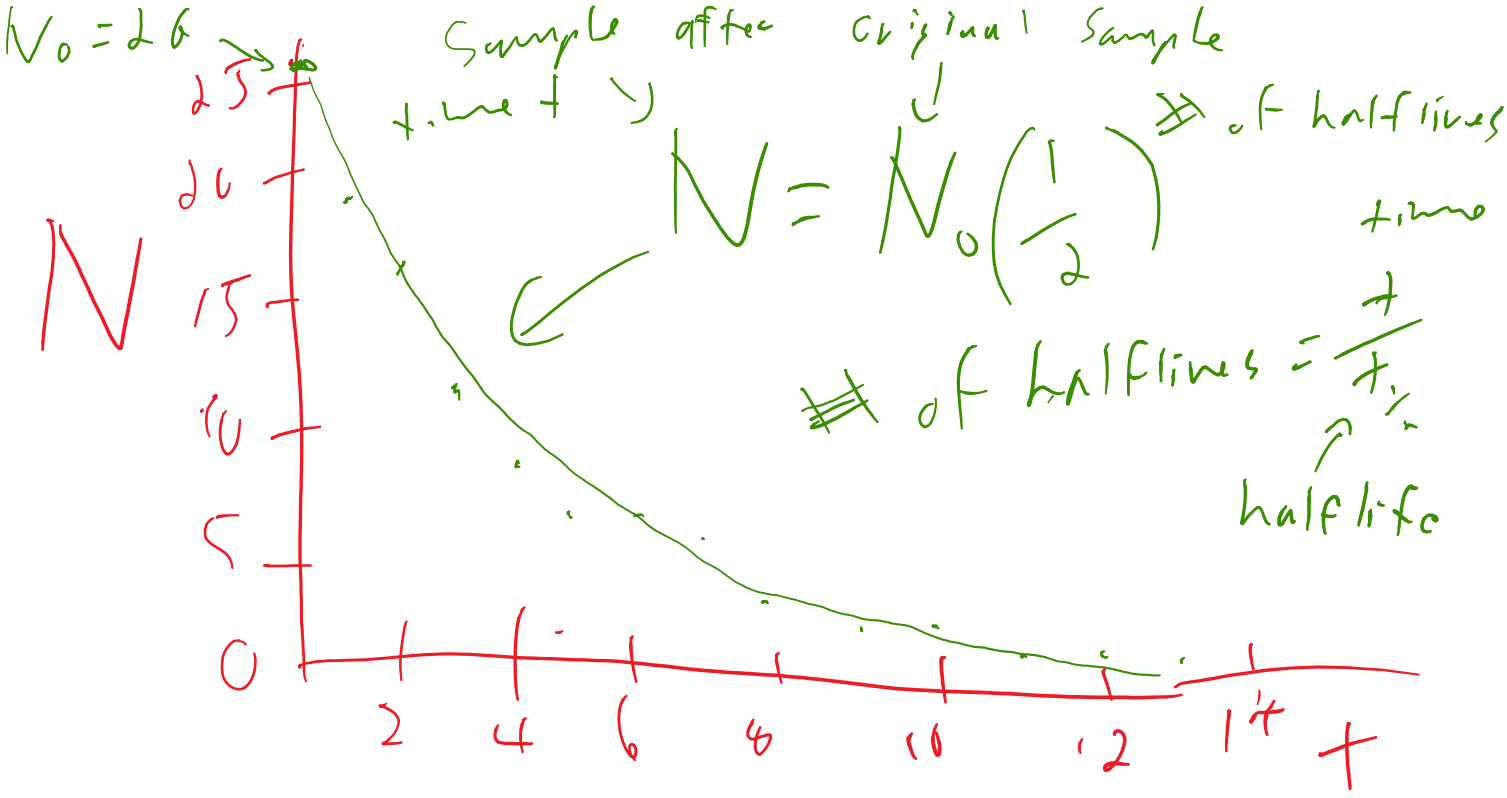
Radioactive Half-Life demonstration:

students have 2 coins
if you flip the coins and get 2 heads, you have "decayed" and you sit down.
You are modelling nuclei that decay randomly.

number of nucleii	time
26	0
18	1
16	2
12	3
8	4
7	5
7	6
6	7
4	8
3	9
3	10
2	11
2	12
1	13

graph the data



N is the number of radioactive nuclei left or the amount of radioactive sample left. Proportional to the activity.
N_o is the original amount of sample.
t is the time
$t_{1/2}$ is the half-life

look up half-lives in a table in the book p 621.

eg. carbon 14 has a half-life of 5700 years. While uranium 238 has a half-life of 4.51×10^9 years

A sample contains both carbon 14 and uranium 238. What fraction of each is remaining after 28500 years?

#of half-lives = $t/t_{1/2}$ = 28500/5700=5
28500/4510000000=0.0
Carbon $(1/2)^5$= 1/32
uranium $(1/2)^{0.0000063}$ =1/1.0000044
homework 622 q9-12 CR 1.1-1.4

Radioactive Half-Life
Drop off your lab reports and get out 2 coins.

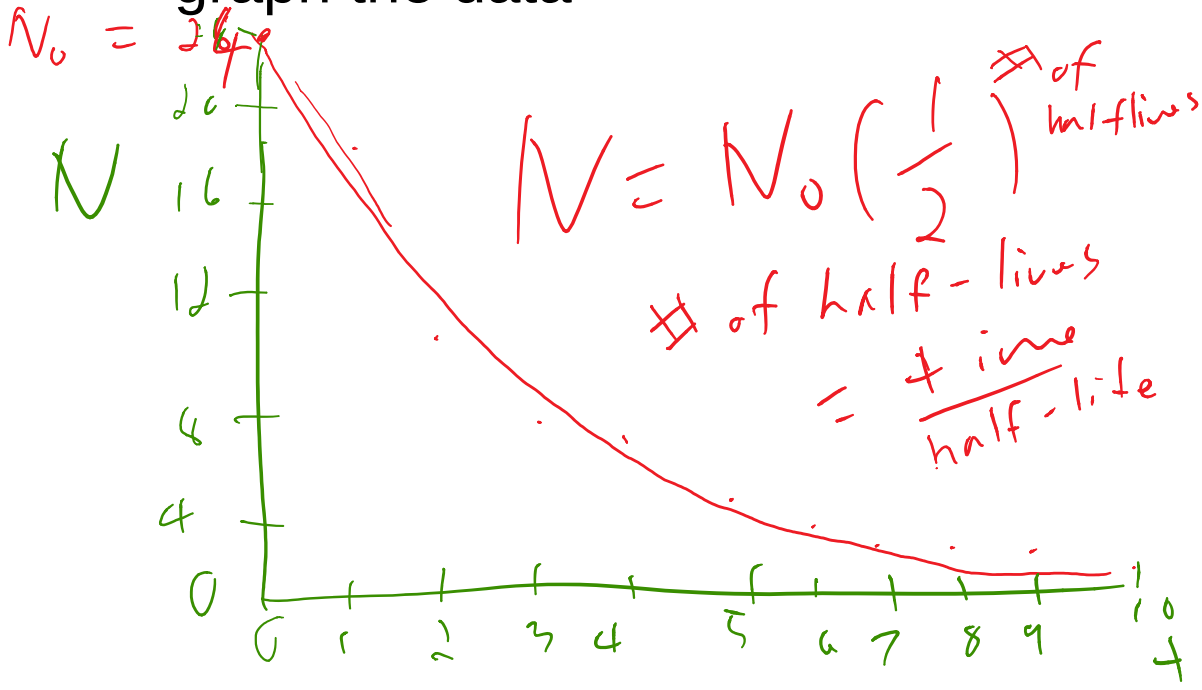
Model Radioactive decay:

Each student is a radioactive nucleus. If you flip the coins and get 2 heads, you are decayed and you sit down (out of the game).

Number of Nuclei (N)	time (in flips)
24	0
18	1
10	2
8	3

7	4
4	5
3	6
2	7
2	8
2	9
1	10

graph the data



Express

$$N = N_0 e^{-\lambda t}$$

$$\lambda = \frac{\ln 2}{t_{1/2}}$$

$$t = \left(\ln \frac{N}{N_0}\right) / -\lambda$$